

WE CLAIM:

1. A chemical vapor deposition process for depositing a nitrogen doped titanium oxide coating on a hot glass substrate, comprising:
 - a) providing a hot glass substrate having a major surface upon
5 which a nitrogen doped titanium oxide coating is to be deposited;
 - b) providing a uniform, vaporized reactant mixture containing a titanium compound, an oxygen-containing compound, and a nitrogen compound;
 - c) delivering the vaporized reactant mixture to the major surface of
10 the hot glass substrate and reacting the mixture to deposit a coating of nitrogen doped titanium oxide on the major surface of the hot glass substrate; and
 - d) cooling the coated glass substrate to ambient temperature.
2. The process of claim 1, wherein the titanium compound is chosen from the
15 group consisting of TiX_4 , Ti(OR)_4 , and $\text{Ti(NR}_2)_4$ where X = a halogen and R = an organic alkyl chain containing 1-4 carbon atoms.
3. The process of claim 2 wherein the titanium compound comprises a halogenated titanium compound.
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4. The process of claim 3 wherein the halogenated titanium compound comprises a chlorinated titanium compound.

5. The process of claim 4 wherein the chlorinated titanium compound comprises TiCl_4 .
- 5 6. The process of claim 1 wherein the oxygen-containing compound is chosen from the group consisting of O_2 and R^1COOR^2 where $\text{R}^1 = \text{H}$ or an organic chain containing 1-4 carbon atoms and $\text{R}^2 =$ an organic chain containing 2-4 carbon atoms.
- 10 7. The process of claim 6 wherein the oxygen-containing compound comprises ethyl acetate.
8. The process of claim 1 wherein the nitrogen-containing compound is chosen from the group consisting of $\text{R}_x\text{NH}_{3-x}$, where $x = 0-3$ and $\text{R} =$ an organic chain containing 1-4 carbon atoms; RCN , where $\text{R} =$ an organic chain containing 1-4 carbon atoms, $\text{R}^1\text{C}(\text{O})\text{NR}^2\text{R}^3$, where $\text{R}^1 = \text{H}$ or an organic chain containing 1-4 carbon atoms, $\text{R}^2 = \text{H}$ or an organic chain containing 1-4 carbon atoms and $\text{R}^3 = \text{H}$ or an organic chain containing 1-4 carbon atoms and mixtures thereof.
- 15 9. The process of claim 8 wherein the nitrogen-containing compound comprises ammonia.
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10. The process of claim 1 wherein the coating process a float glass manufacturing process.
11. The process of claim 10 wherein the coating process takes place in, or adjacent
5 to, the float bath.
12. The process of claim 11 wherein the coating process occurs at a temperature of from 900-1350°F.
- 10 13. The process of claim 12 wherein the coating process occurs at a temperature of from 1100-1280°F.
14. The process of claim 13 wherein the coating process occurs at atmospheric pressure.
- 15 15. The process of claim 14 wherein the titanium oxide coating is deposited at a thickness of from 10 Å to 2500 Å.
16. The process of claim 15 wherein the titanium oxide coating is deposited at a
20 thickness of from 100 Å to 500 Å.

17. The process of claim 1 wherein a color suppressing coating is deposited on the major surface of the hot glass substrate prior to the deposition of the titanium oxide coating thereon.

5 18. A chemical vapor deposition process for applying a nitrogen doped titanium oxide coating to a surface on a hot glass substrate comprising:

a) providing a hot glass substrate, including a surface upon which a nitrogen doped titanium oxide coating is to be deposited;

10 b) depositing a sodium diffusion barrier layer directly on said hot glass substrate;

c) providing a uniform, vaporized reactant mixture comprising:
 a titanium compound, chosen from the group consisting of TiX_4 , $Ti(OR)_4$ and $Ti(NR_2)_4$ where X = a halogen and R = an organic alkyl chain containing 1-4 carbon atoms; an oxygen-containing compound chosen from the group
 15 consisting of O_2 and $R^1 = H$ or an organic chain containing 1-4 carbon atoms and $R^2 =$ an organic chain containing 2-4 carbon atoms; a nitrogen-containing compound chosen from the group consisting of R_xNH_{3-x} , where $x = 0-3$ and $R^2 =$ an organic chain containing 1-4 carbon atoms; RCN where R = an organic chain containing 1-4 carbon atoms; $R^1 C(O)NR^2R^3$, where $R^1 = H$ or an organic chain
 20 containing 1-4 carbon atoms, $R^2 = H$ or an organic chain containing 1-4 carbon atoms and $R^3 = H$ or an organic chain containing 1-4 carbon atoms, and mixtures thereof; and

- d) delivering said vaporized reactant mixture to the surface of said hot glass substrate and reacting the mixture to deposit a coating of nitrogen doped titanium oxide on said surface of said hot glass substrate; and
- e) cooling said coated glass substrate to ambient temperature.

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19. The process of claim 18, wherein the sodium diffusion barrier layer comprises silica.

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20. The process of claim 1 wherein the titanium oxide coating exhibits an average extinction coefficient greater than 7×10^{-4} in the range of 400-800 nm.

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21. The process of claim 1 wherein the titanium oxide coating absorbs at least 20% more light in the range of 400-800 nm than the undoped titanium oxide coating.

22. The process of claim 1 wherein the titanium oxide coating exhibits absorption of light at a wavelength of greater than 400 nm to 600 nm.

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23. A chemical vapor deposition process for applying a nitrogen doped titanium oxide coating to a surface on a hot glass substrate comprising:

a) providing a hot glass substrate having a surface upon which a nitrogen doped titanium oxide coating is to be deposited;

b) floating said hot glass substrate on a bath of molten tin in a controlled gaseous atmosphere;

5 c) depositing a color-suppressing coating directly on the surface of the hot glass substrate upon which the nitrogen doped titanium oxide is to be deposited;

d) providing a uniform, vaporized reactant mixture comprising titanium tetrachloride, ethyl acetate and ammonia;

10 e) delivering said vaporized reactant mixture to the surface of said hot substrate under essentially, atmospheric pressure and reacting the mixture at a temperature of from 1100° F - 1280° F, to deposit a coating of nitrogen doped titanium oxide on said surface of said hot glass substrate; and

f) cooling said coated glass substrate to ambient temperature.

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